

IN THE CLAIMS:

Amendments to the Claims

Please cancel claim 6 without prejudice or disclaimer of the subject matter thereof, and please amend claims 7 and 8 and add the new claims as shown below.

Listing of Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claims 1-6 (canceled)

7. (currently amended) A plasma processing method using a spectroscopic processing unit, comprising the steps of:

a) separating spectrally plasma radiation emitted from a vacuum process chamber into component spectra;

b) converting said component spectra into a time series of analogue electric signals composed of different wavelength components at a predetermined period;

~~adding together analogue signals of the different wavelength components;~~

c) converting ~~a plurality of plural added~~ said analogue electric signals into digital ~~quantities~~ signals on a predetermined-period basis;

~~digitally adding said plurality of added and converted signals a plural number of times on a plural signal basis;~~

d) adding, ~~said digitally added wavelength-based signals by referencing reference to~~ for each of at least two predetermined plural kinds of materials within said vacuum process chamber, said digital signals of a set of wavelengths corresponding to a set of emission spectrum wavelengths intrinsic to ~~materials as established previously~~ the material;

e) determining discriminatively an end point of a predetermined plasma process on the basis of ~~a signal resulting from said digital addition~~ said added signals obtained in said step d); and

f) terminating said predetermined plasma process.

8. (currently amended) A plasma processing method using a spectroscopic processing unit, comprising the steps of:

a) separating spectrally plasma radiation emitted from a vacuum process chamber into component spectra;

b) converting said component spectra into a time series of analogue electric signals composed of different wavelength components at a predetermined period;

~~adding together analogue signals of the different wavelength components;~~

c) converting ~~a plurality of plural added~~ said analogue electric signals into digital ~~quantities~~ signals on a predetermined-period basis;

~~digitally adding said plurality of added and converted signals a plural number of times on a plural signal basis;~~

d) adding, ~~said digitally added wavelength-based signals by referencing to~~ for each of at least two predetermined plural kinds of materials within said vacuum process chamber, said digital signals of a set of wavelengths corresponding to a set of emission spectrum wavelengths intrinsic to materials as established previously the material;

e) performing an adding or alternatively subtracting or alternatively dividing operation between ~~said digitally added material-based signals correspondingly in dependence on said material~~ signals obtained in step d) as to said at least two of said predetermined plural kinds of materials;

f) determining discriminatively an end point of a predetermined plasma process on the basis of a signal resulting from ~~said digital addition~~ step e); and

g) terminating said predetermined plasma process.

9. (new) A plasma processing method according to claim 7, wherein said step d) includes a substep of:

d1) adding, as to one of said plural kinds of materials which intensities of emission spectra decrease at substantially the end point of the predetermined plasma process, said digital signals of a set of wavelengths corresponding to a set of emission spectrum wavelengths intrinsic to the one material; or

d2) adding, as to another of said plural kinds of materials which intensities of emission spectra increase at substantially the end point of the predetermined plasma process, said digital signals of a set of wavelengths corresponding to a set of emission spectrum wavelengths intrinsic to the another material.

10. (new) A plasma processing method according to claim 9, wherein said step d) further includes a substep of:

d3) adding, as to still another of said plural kinds of materials which intensities of emission spectra do not substantially change before and after the end point of the predetermined plasma process, said digital signals of a set of wavelengths corresponding to a set of emission spectrum wavelengths intrinsic to the still another material.

11. (new) A plasma processing method according to claim 10, wherein said step d) further includes a substep of:

d4) dividing said added signals obtained in said step d1) by said added signals obtained in said step d3), or

d5) dividing said added signals obtained in said step d2) by said added signals obtained in said step d3).

12. (new) A plasma processing method according to claim 7, wherein said predetermined plasma process is an etching process.

13. (new) A plasma processing method according to claim 7, wherein said step c) includes substeps of:

c1) adding together analogue signals of the different wavelength components;
c2) converting a plurality of plural added signals into digital quantities on a predetermined-period basis to obtain said digital signals; and

c3) digitally adding said digital signals obtained in said step c2) a plural number of times on a plural-signal basis, wherein in said step d), for each of the at least two of predetermined plural kinds of materials within said vacuum process chamber, said digitally added digital signals of the set of wavelengths corresponding to the set of emission spectrum wavelengths intrinsic to the material are added.

14. (new) A plasma processing method according to claim 8, wherein said step d) includes a substep of:

d1) adding, as to one of said plural kinds of materials which intensities of emission spectra decrease at substantially the end point of the predetermined plasma process, said digital signals of a set of wavelengths corresponding to a set of emission spectrum wavelengths intrinsic to the one material; or

d2) adding, as to another of said plural kinds of materials which intensities of emission spectra increase at substantially the end point of the predetermined plasma process, said digital signals of a set of wavelengths corresponding to a set of emission spectrum wavelengths intrinsic to the another material.

15. (new) A plasma processing method according to claim 8, wherein said step e) includes a substep of:

e1) performing an adding process between said added signals obtained in said step d) as to one of said plural kinds of materials which intensities of emission spectra decrease at substantially the end point of the predetermined plasma process and said added signals obtained in said step d) as to another of said plural kinds of materials which intensities of emission spectra decrease at substantially the end point of the predetermined plasma process; or

e2) performing an adding process between said added signals obtained in said step d) as to one of said plural kinds of materials which intensities of emission spectra increase at substantially the end point of the predetermined plasma process and said added signals obtained in said step d) as to another of said plural kinds of materials which intensities of emission spectra increase at substantially the end point of the predetermined plasma process; or

e3) performing a subtracting process between said added signals obtained in said step d) as to one of said plural kinds of materials which intensities of emission spectra decrease at substantially the end point of the predetermined plasma process and said added signals obtained in said step d) as to another of said plural kinds of materials which intensities of emission spectra increase at substantially the end point of the predetermined plasma process.

16. (new) A plasma processing method according to claim 14, wherein said step d) further includes a substep of:

d3) adding, as to still another of said plural kinds of materials which intensities of emission spectra do not substantially change before and after the end point of the predetermined plasma process, said digital signals of a set of wavelengths corresponding to a set of emission spectrum wavelengths intrinsic to the still another material.

17. (new) A plasma processing method according to claim 16, wherein said step e) further includes a substep of:

d4) dividing said added signals obtained in said step d1) by said added signals obtained in said step d3), or

d5) dividing said added signals obtained in said step d2) by said added signals obtained in said step d3).

18. (new) A plasma processing method according to claim 8, wherein said predetermined plasma process is an etching process.

19. (new) A plasma processing method according to claim 8, wherein said step c) includes substeps of:

c1) adding together analogue signals of the different wavelength components;

c2) converting a plurality of plural added signals into digital quantities on a predetermined-period basis to obtain said digital signals; and

c3) digitally adding said digital signals obtained in said step c2) a plural number of times on a plural-signal basis, wherein in said step d), for each of the at least two of predetermined plural kinds of materials within said vacuum process chamber, said digitally added digital signals of the set of wavelengths corresponding to the set of emission spectrum wavelengths intrinsic to the material are added.